

Working Draft Agenda:

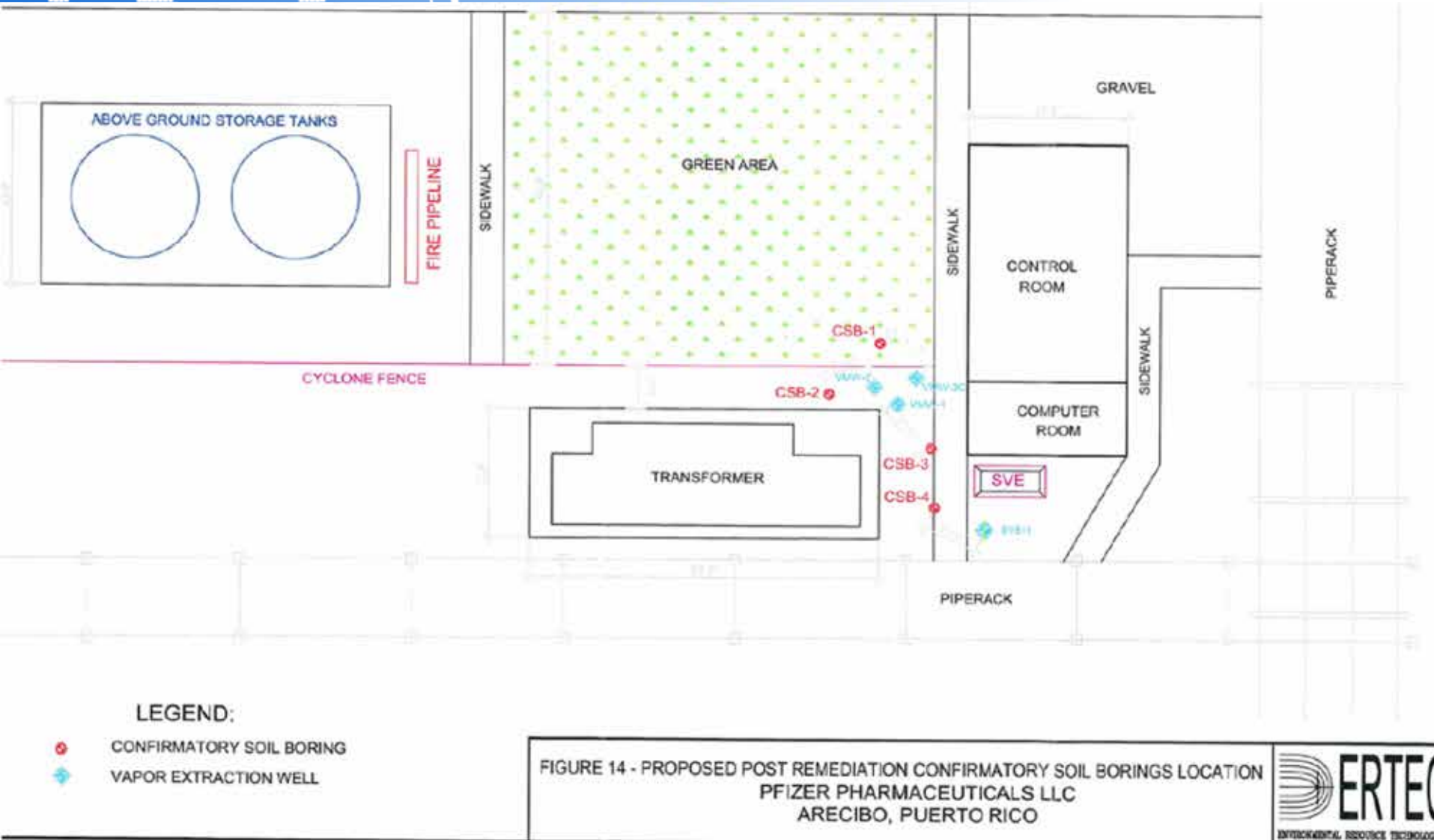
1. Overview of Additional Soil (RCRA/CMS) Investigations – Scope and Results
2. Technical Implications of Soil Investigation Results & Next Steps
 - Technical Physical/Technical limitations (Geology)
 - Soil Cleanup goals (30 ppb for Carbon Tet.) - Site-specific Risk-based criteria needed
 - Part B Permit - Implications
3. Status Update of Pump-Treat Remedy
4. Well Inventory (Update) and Recommendations

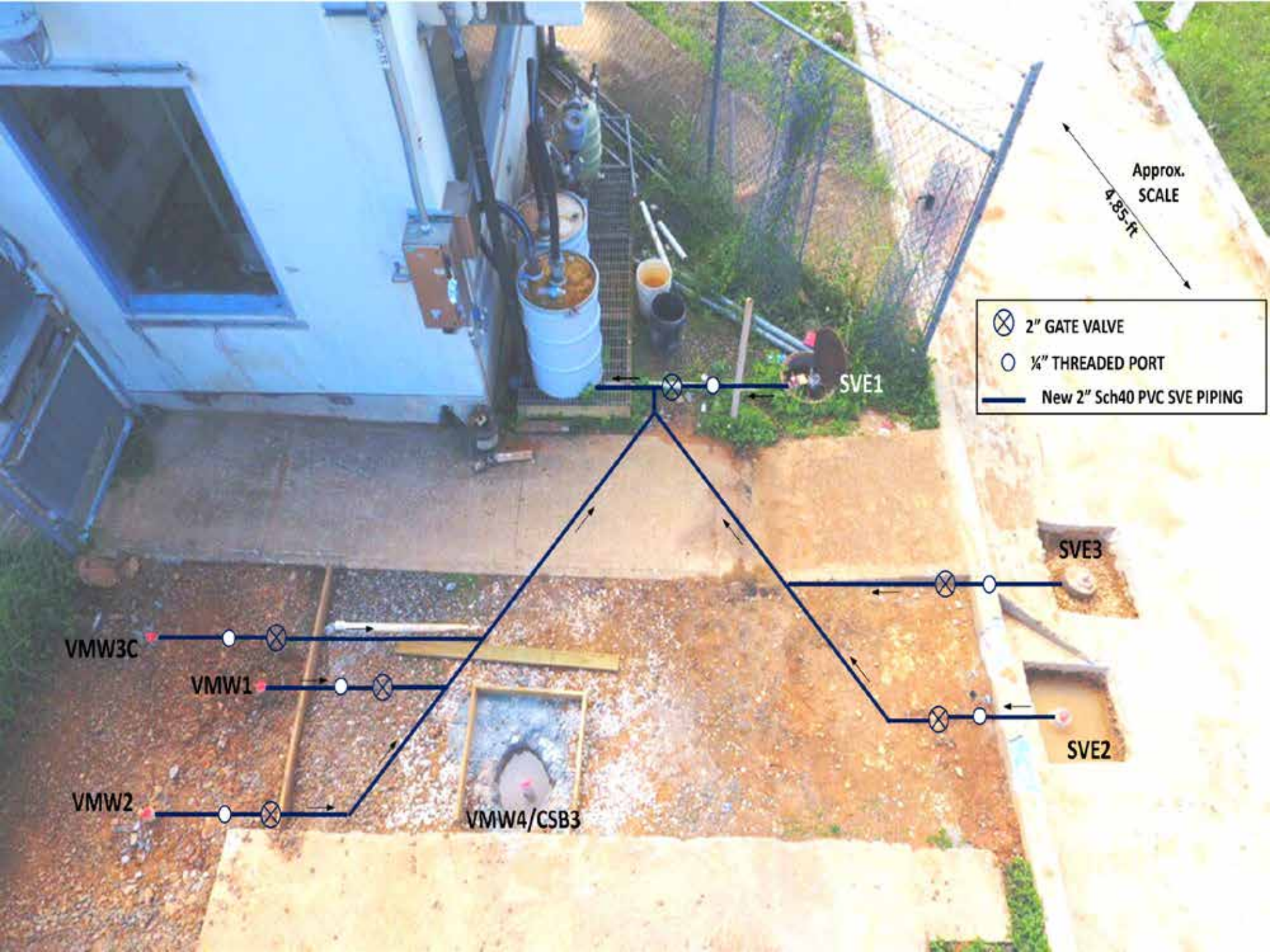
1. Overview of Additional Soil (RCRA/CMS) Investigations:

- **Objective**: To determine if Soil Vapor Extraction (SVE) modifications may be needed - and where we stand with soil remediation (May 8, 2016 Work Plan letter approved by EPA July 2016).
- **Scope**: 4 Soil borings consistent with CMS for post-remediation confirmation sampling scope (see Figure)
 - Per CMS - Soil sampling at 5-ft intervals from 100 to 200 ft bgs or refusal,
 - Additional to CMS: Screened for VOCs with PID from 80 to 100 ft (or refusal) – with discretion to submit additional samples for analysis
 - CMS: Carbon Tetrachloride target cleanup level – 30 ppb.

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Fig. 14 CMS Confirmatory Borings





Approx.
SCALE

4.85-ft



2" GATE VALVE



1/4" THREADED PORT

New 2" Sch40 PVC SVE PIPING

SVE1

SVE3

SVE2

VMW3C

VMW1

VMW2

VMW4/CSB3



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Fig 10 CMS Cross-Section Loc.

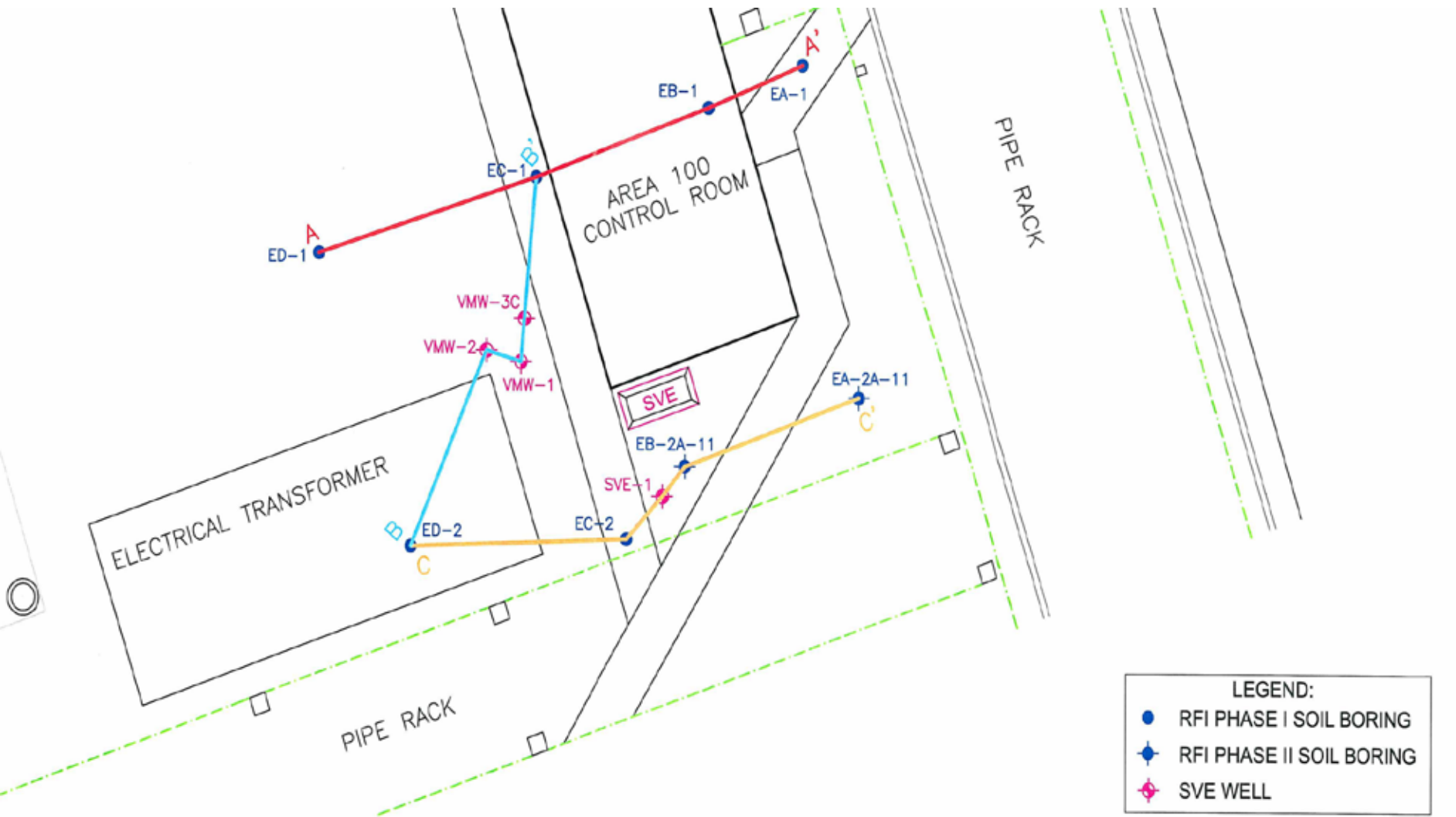
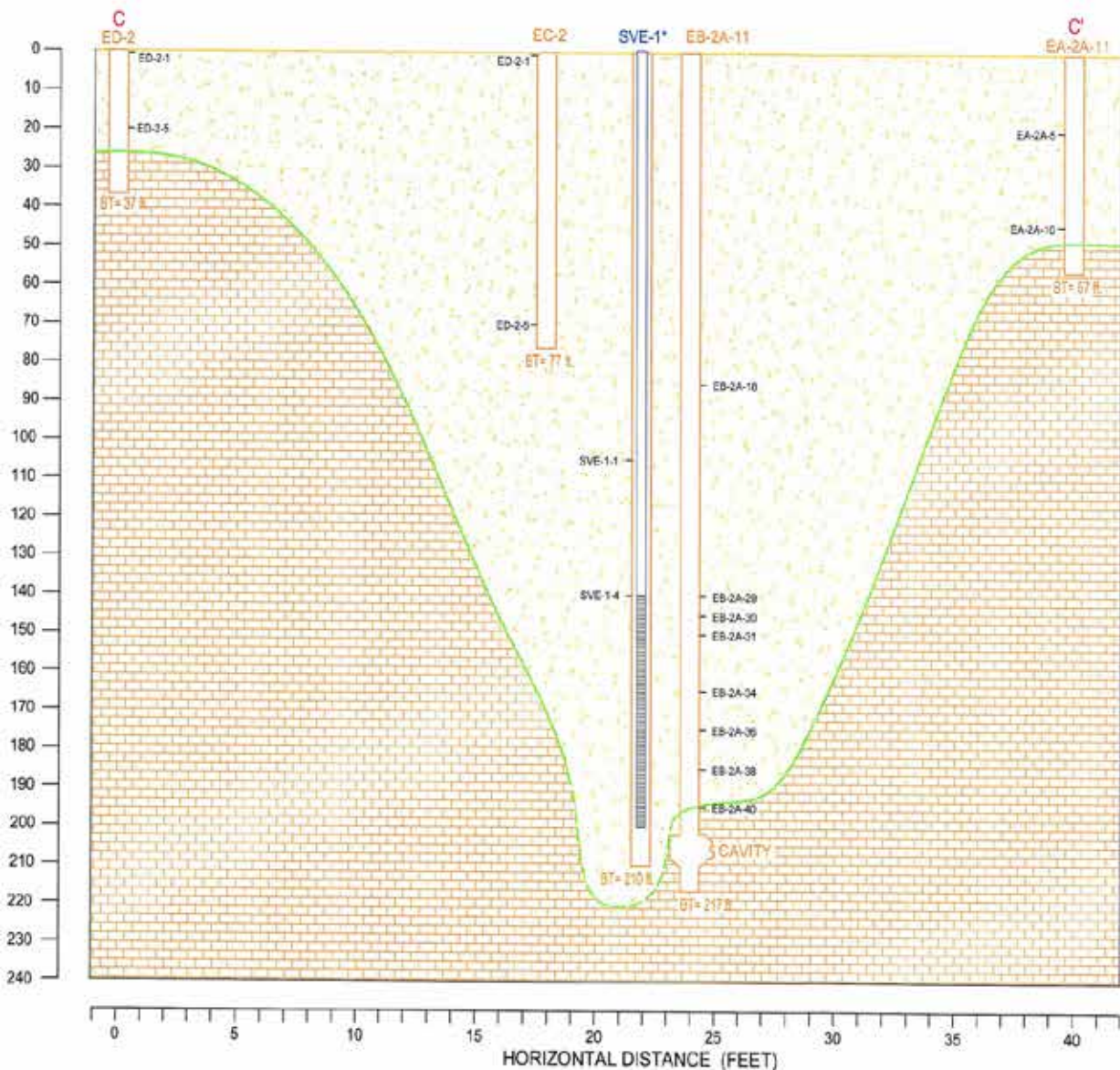


FIGURE 10 - CROSS SECTIONS LAY-OUT
CORRECTIVE MEASURE STUDY
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ANALYTE (ug/kg)	ED-2-1 (0-2 ft.)	ED-2-5 (20-22 ft.)	EC-2-1 (0-2 ft.)	EC-2-15 (70-72 ft.)	EC-2-15 DL (70-72 ft.)	SVE-1-1 (105-110 ft.)
CARBON TETRACHLORIDE	11 UJ	33 UJ	11 UJ	13 UJ	64 UJ	58,000
METHYLENE CHLORIDE	54 UJ	140 UJ	11 UJ	R	64 UJ	1,300 J
ACETONE	180 UJ	160 UJ	11 UJ	R	360 UJ	11,000
CHLOROFORM	11 UJ	33 UJ	11 UJ	13 UJ	64 UJ	22,000

ANALYTE (ug/kg)	SVE-1-4 (140-142 ft.)	EB-2A-18 (85-87 ft.)	EB-2A-29 (140-142 ft.)	EB-2A-30 (145-147 ft.)	EB-2A-31 (150-152 ft.)	EB-2A-31 DL (150-152 ft.)
CARBON TETRACHLORIDE	8,400	U	U	320 J	20,000	R
METHYLENE CHLORIDE	3,600	12 UJ	1,600 U	2,000 U	17,000 U	R
ACETONE	ND	17 UJ	24,000	30,000	R	83,000 J
CHLOROFORM	20,000	U	U	2,100 U	27,000	R

ANALYTE (ug/kg)	EB-2A-34 (165-167 ft.)	EB-2A-36 (175-178 ft.)	EB-2A-38 (185-187 ft.)	EB-2A-40 (195-197 ft.)	EA-2A-5 (20-25 ft.)	EA-2A-10 (45-47 ft.)
CARBON TETRACHLORIDE	210 J	9,600 J	7,800 J	300 J	UJ	UJ
METHYLENE CHLORIDE	2,700 UJ	3,800 UJ	3,900 UJ	65 UJ	12 UJ	13 UJ
ACETONE	18,000 J	19,000 J	3,600 UJ	65 UJ	17 UJ	21 UJ
CHLOROFORM	3,500 J	7,800 J	6,500 J	820 J	UJ	UJ

NOTES:

UG/KG MICROGRAMS PER KILOGRAM.

ND NOT DETECTED.

U THE COMPOUND WAS ANALYZED FOR, BUT WAS NOT DETECTED ABOVE THE SAMPLE QUANTITATION LIMIT.

UJ THE ANALYTE WAS NOT DETECTED ABOVE THE REPORTED QUANTITATION LIMIT.

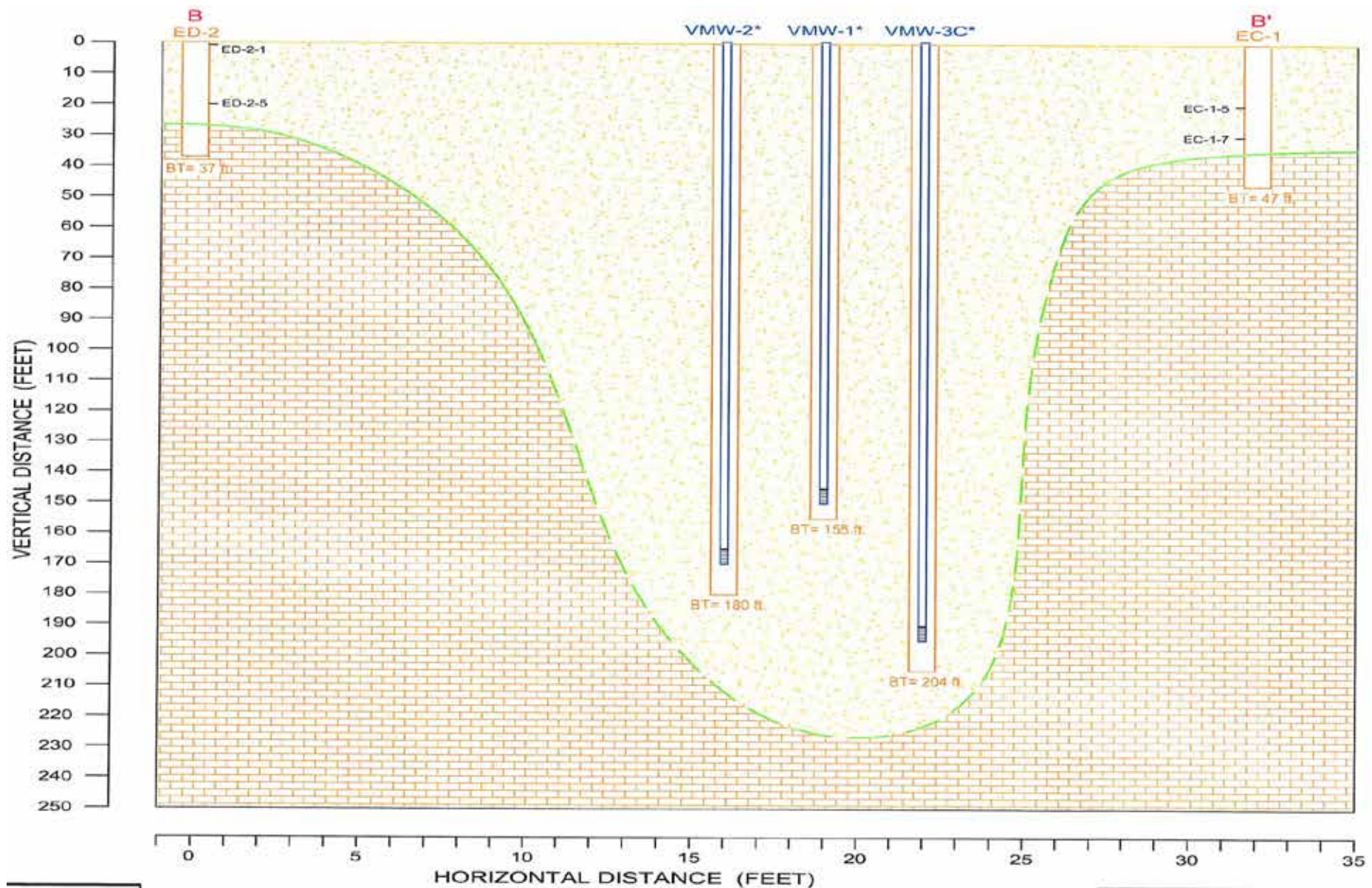
J THE ANALYTE WAS POSITIVELY IDENTIFIED; THE ASSOCIATED VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.

R REJECTED.

Scale: NTS
FIG 13
DR: EDH
C-98-0507

FIGURE 13 - CROSS SECTION C-C'
CORRECTIVE MEASURE STUDY
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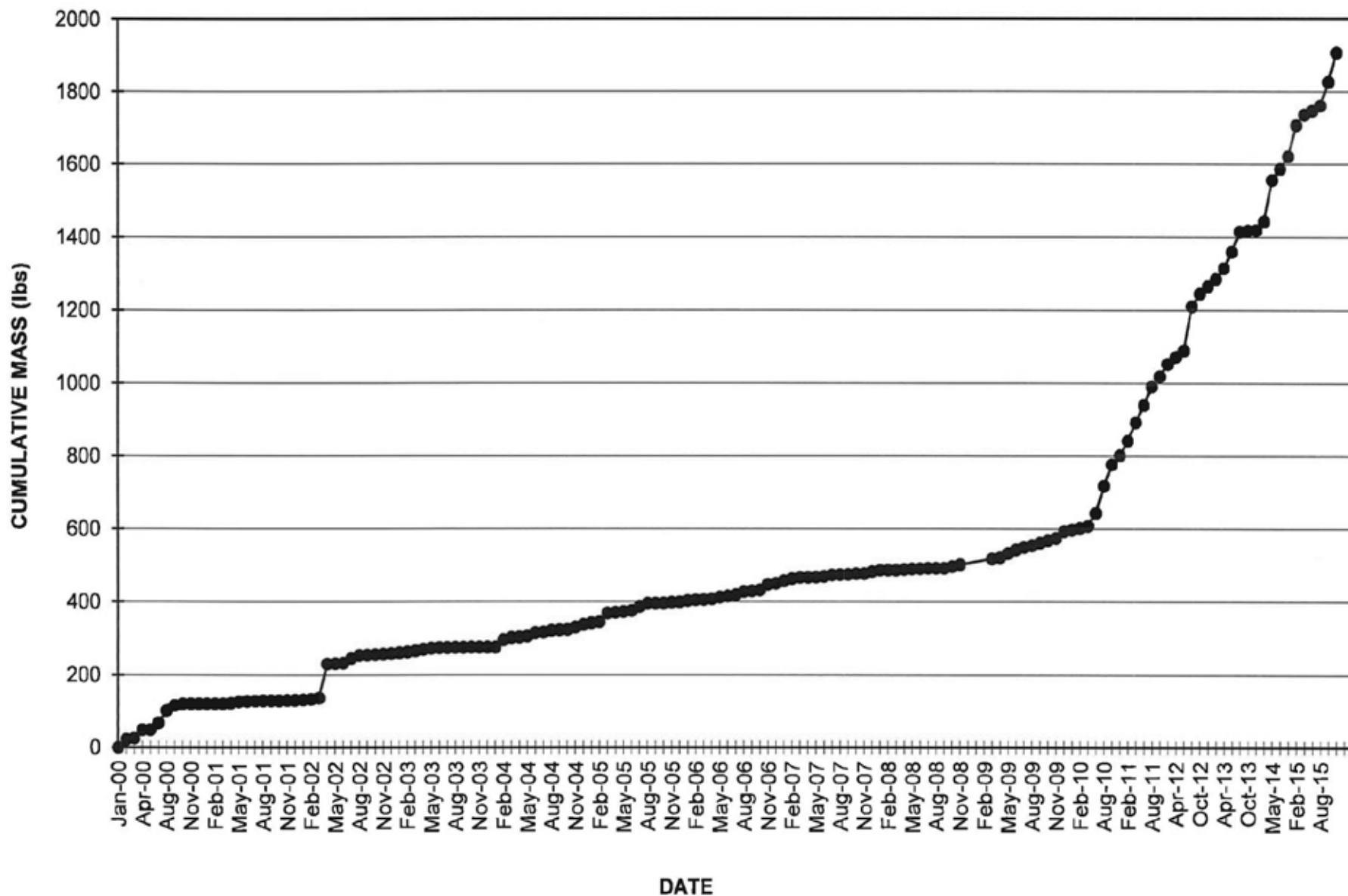
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Fig 12 From CMS - VMW's used for SVE



Well ID	Well Diameter (inches)	Well Depth (feet bgs)	Screen Interval (feet bgs)	Well Sump Interval (feet bgs)
VMW-1	2	150	145 to 150	NA
VMW-2	2	170	165 to 170	NA
VMW-3C	2	195	190 to 195	NA
SVE-1	4	200	140 to 190	190 to 200

Wells previously used for SVE in CMS

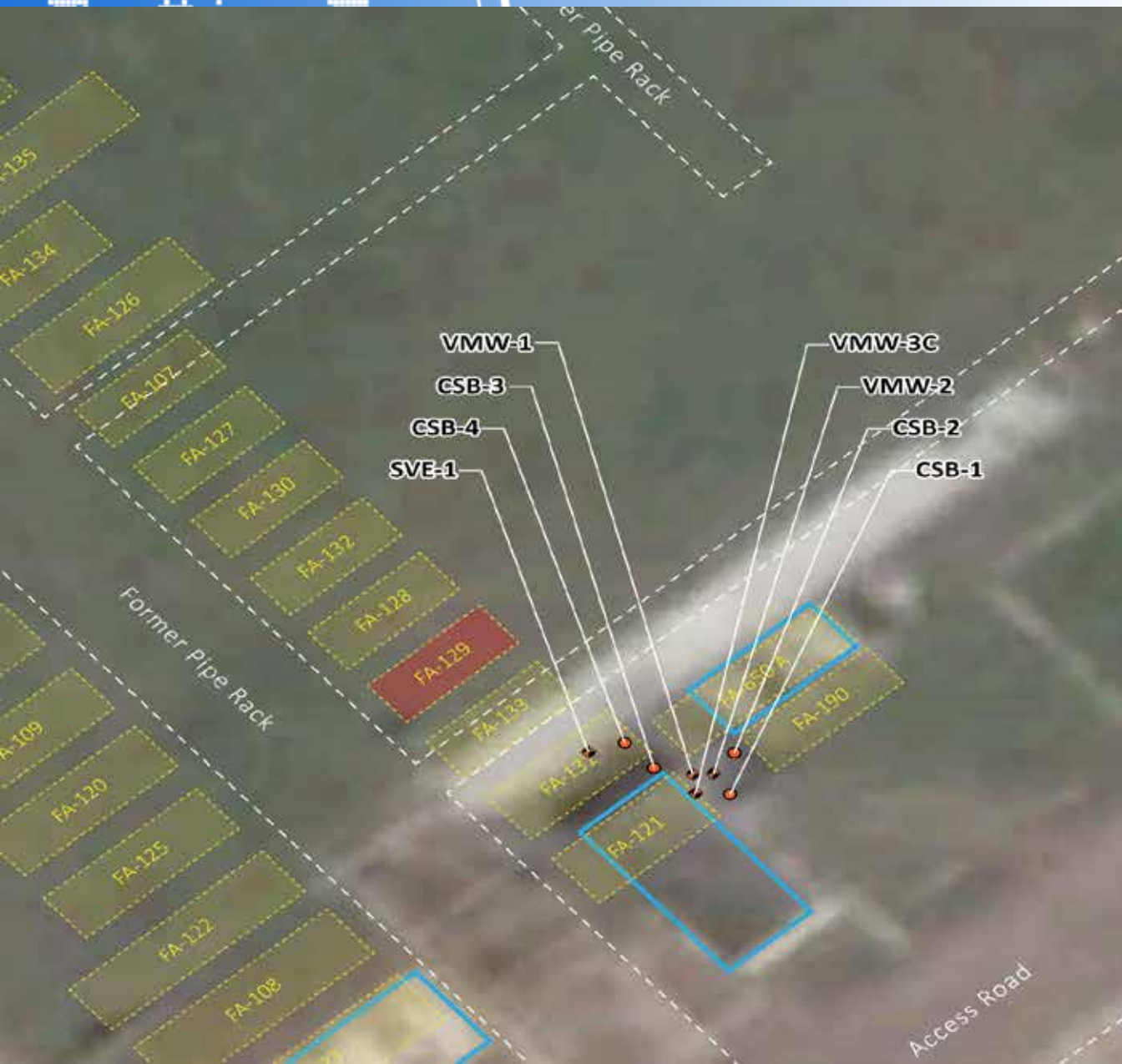
TOTAL VOCs CUMULATIVE MONTHLY EXTRACTION







Pulsing procedures since February 2010. Pulsing on-off periods on 1-month basis from February thru May 2014.
Pulsing on/off periods on 2-months basis from June thru August 2014, and since September 2015.

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LEGEND

-  Confirmatory soil boring
-  Vapor extraction well
-  Former UST location (failed tank FA-121)
-  Existing structure

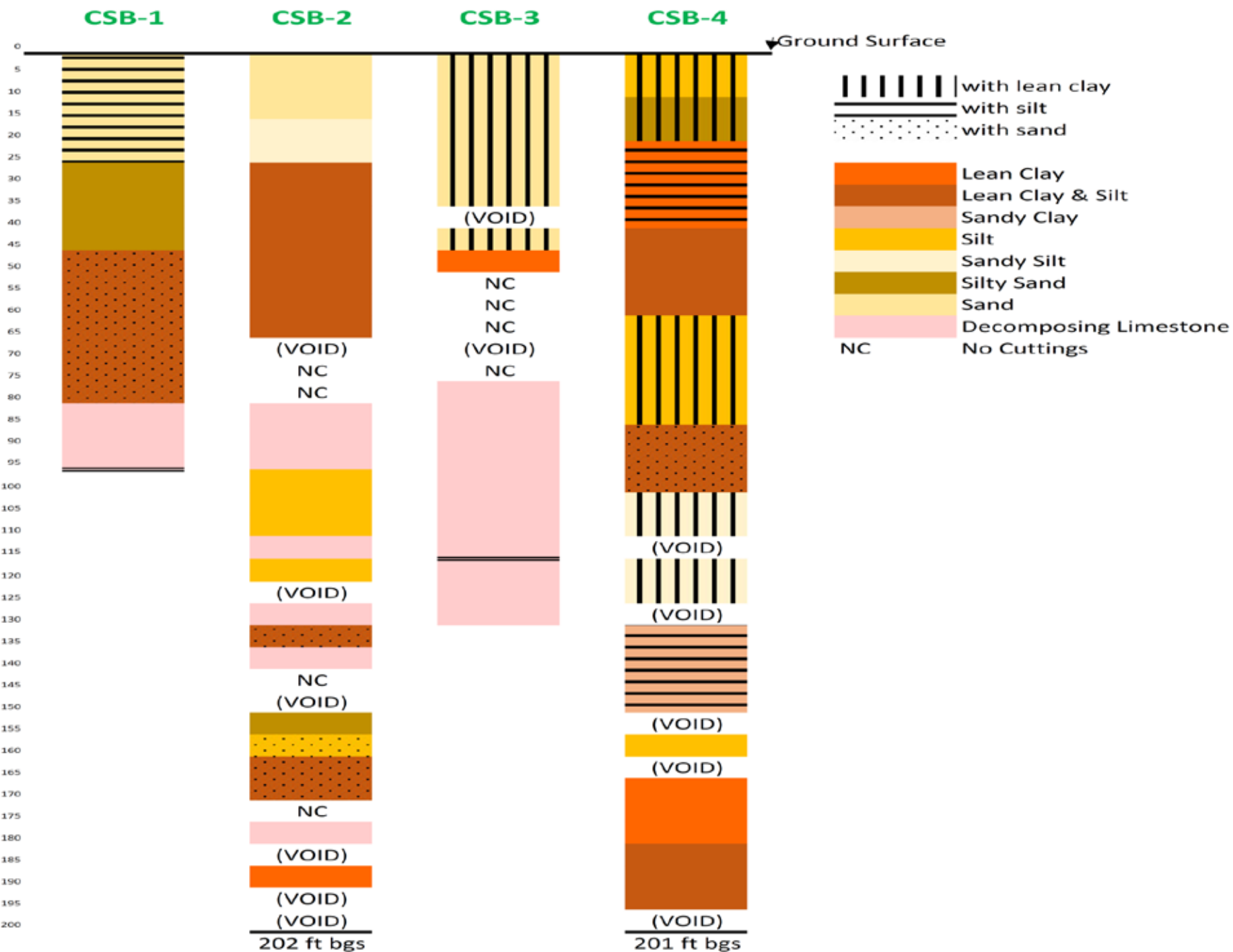
NOTES

1. UST = underground storage tank.
2. AST = aboveground storage tank.
3. Well and boring locations from Ertech, 2005.
4. UST locations from CDM, 1984, and Ertech, 1995.
5. All locations approximate.

1. **General Results of Soil Investigation:**

- CSB-1 – TD 95.25 ft (Refusal) – w/ no PID readings (zero) or no recovery (80-95 ft).
- CSB-2 - TD 202 ft.; 9 soil samples for VOC analysis:
 - 38,000 ppb CT @ 185-190 ft
- CSB-3 - TD 165 ft; 1 soil sample @ 95 ft (ND for VOCs) due to poor recovery (weathered rock);
- CSB-4 - TD 201 ft; 8 samples for VOC analysis:
 - 17,000,000 ppb (1.7 %) CT 100 to 105 ft
 - 65,000 ppb CT 195 to 200 ft.
 - 2,000 to 13,000 ppb CT from 115 to 160 ft

Sample Depth Interval (ft)	CSB-2				CSB-4			
	Acetone	Carbon Tet.	Chloroform	Meth Cl	Acetone	Carbon Tet.	Chloroform	Meth Cl
	8,000	30	300	10	8,000	30	300	10
80-85	--	--	--	--	--	--	--	--
85-90	9U	3J	2J	4U	--	--	--	--
90-95	--	--	--	--	--	--	--	--
95-100	--	--	--	--	--	--	--	--
100-105	--	--	--	--	41,000U	17,000,000	9,000J	20,000U
105-110	20	4U	4U	4U	--	--	--	--
110-115	--	--	--	--	--	--	--	--
115-120	6J*	250	15*	4U	8U	2,100	860	7
120-125	--	--	--	--	--	--	--	--
125-130	16	11	3J	4U	--	--	--	--
130-135	--	--	--	--	--	--	--	--
135-140	--	--	--	--	29	13,000	2,000	62
140-145	--	--	--	--	--	--	--	--
145-150	11	14	2J	4U	--	--	--	--
150-155	72	41	8	4U	--	--	--	--
155-160	390U	26	5	5U	18U	2,000	1,200	40
160-165	--	--	--	--	--	--	--	--
165-170	53	4U	4U	4U	--	--	--	--
170-175	--	--	--	--	--	--	--	--
175-180	--	--	--	--	140	12	15,000	1,700
180-185	--	--	--	--	430U	1,400	8,600	340
185-190	17	38,000	1,700	32	--	--	--	--
190-195	--	--	--	--	--	--	--	--
195-200	--	--	--	--	11,000	65,000*	39,000	5,200*
Final Interval					550U	12,000	5,200	270U



Observations:

- Relatively shallow zone (100 to 105 ft) of high concentrations (1.7 % CT) were found in CSB-4 where previously detected in CMS; no SVE wells were previously screened at that depth.
- High concentrations were primarily associated with lean clays – where air movement is very limited.
- Relatively high concentrations were also found at depths that correspond to screen intervals of active SVE-wells – indicating limitations in air flow (radius of influence and diffusion/rate-limited in **clay**-rich areas); thus, target criteria of 30 ppb for carbon tetrachloride in soils is not technically practical nor achievable.

Results Cont.

Based on soil sampling results:

- Two additional SVE wells and one additional VM-Well installed:
 - SVE-2 Screened 100-105' adjacent to CSB-4 (1.7% CT)
 - SVE-3 Screened 195-200' adjacent to CSB-4 (65,000 ppb CT)
 - VMW-4 Screened 95-105' (in CSB-3)

Next Steps RE: RCRA – CMS:

1. Conduct SVE performance testing (including vapor sampling) on each SVE well and develop system modifications (if necessary) and revised operating schedule (November 2016).
2. Prepare/submit report to Agencies – summarizing investigation results, SVE performance testing results, and system modifications (Dec 2016).
3. Continue SVE operations and routine qtlly and semi-annual groundwater sampling (as currently approved) - for a certain period of time (e.g. 2 years) - to evaluate groundwater quality response (improvements) to SVE modifications before evaluating further options/actions for soil/source area.
4. Evaluate risk-based clean-up goals of soils – that are more applicable to protection of groundwater (risk-based) as current target criteria are not practical for isolated clay-rich pockets. Update site Risk Assessment.
5. Discuss options for closing out or modifying the Part B Permit (e.g. closing operational portion of permit – given all operating units are closed – keeping CMS/remediation scope element).

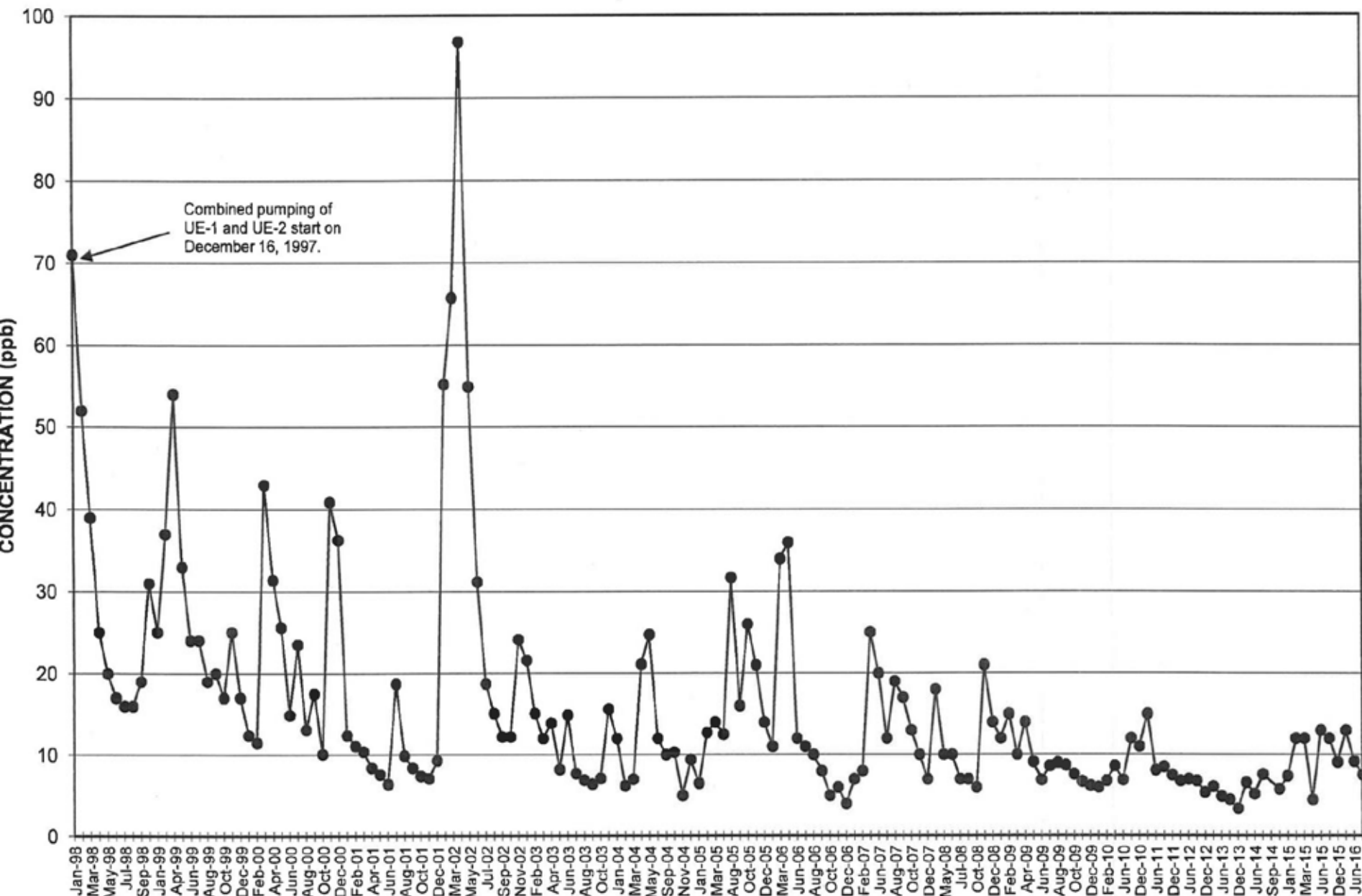
Pump/Treat Status Update:

- Ø Concentrations remain at low-levels: 5 to 13 ppb in extraction wells UE-1 & UE-2 - pumping 300 gpm combined (200 GPM in UE-1 & 100 GPM UE-2).
- Ø No exceedances in MCLs or significant increases down-gradient since pumping reduction (600 gpm to 300 gpm) - in May 2015 – as documented in Semi-Annual Monitoring Reports.
- Ø Pump/Treat operational reliability has been very good (very little down-time - avg. few hours per year) since upgraded (automated) system was installed in 2010.
- Ø Recent soil sampling information further confirms - technically not practical to totally eliminate low-level source in 300 feet of karst vadose-zone (33 years of pumping – began 1983).

CARBON TETRACHLORIDE CONCENTRATIONS IN GROUNDWATER - 2016
SEMI-ANNUAL MONITORING PROGRESS REPORT - APRIL TO SEPTEMBER 2016
PFIZER PHARMACEUTICALS LLC (FORMER UPJOHN CO.)
ARECIBO, PUERTO RICO

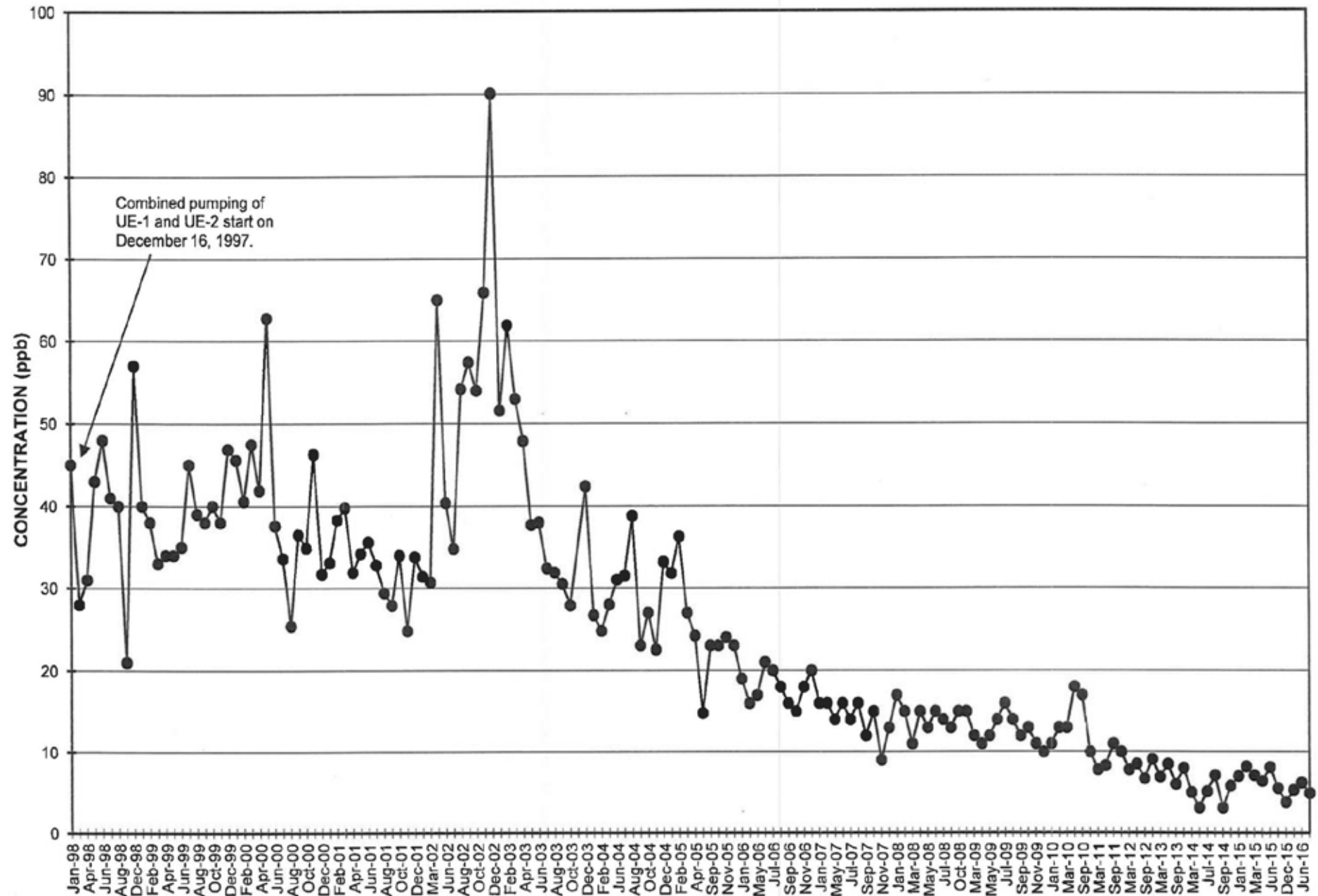
Well ID	Period:	03/16 ^{1/}	06/16 ^{2/}	09/16 ^{1/}
	Pumping Rate:	250 gpm combined	300 gpm combined ^{4/}	300 gpm combined
	Units:	(ug/L)	(ug/L)	(ug/L)
	MCL:	5 ug/L		
UE-1		13	9.2	7.6
UE-2		5.3	6.2	4.9
AT-IN		9.6	8.4	7.6
AT-OUT		0.27J	2.7	1.0u
MW-1		6.2	3/	1.9
MW-6		3.0	3/	2.0
MW-9		1.0U	3/	1.0u
MW-12		1.0U	3/	1.0u
MW-17		2.6	3/	1.4
MW-18		0.88J+	3/	2.6
MW-301B		7.5	3/	3.5
MW-302		6.6	3/	5.6

CARBON TETRACHLORIDE IN GROUNDWATER UE-1



ppb = Parts per billion or micrograms per liter (ug/L).

CARBON TETRACHLORIDE IN GROUNDWATER UE-2



Well Inventory (update) – In Oct 2016 Semi-Annual Report

- Scope: Searched for historic wells – with last survey in 1997 (19 years ago).
- Results: Some wells found – some not due to access (thick forest).
- Recommendations: Request EPA approval to seal/plug (abandon) accessible wells not used for groundwater monitoring network north of Rt 2 (i.e. MW-23, MW-204, MW-102, MW-16 MW-20, & MW-21)

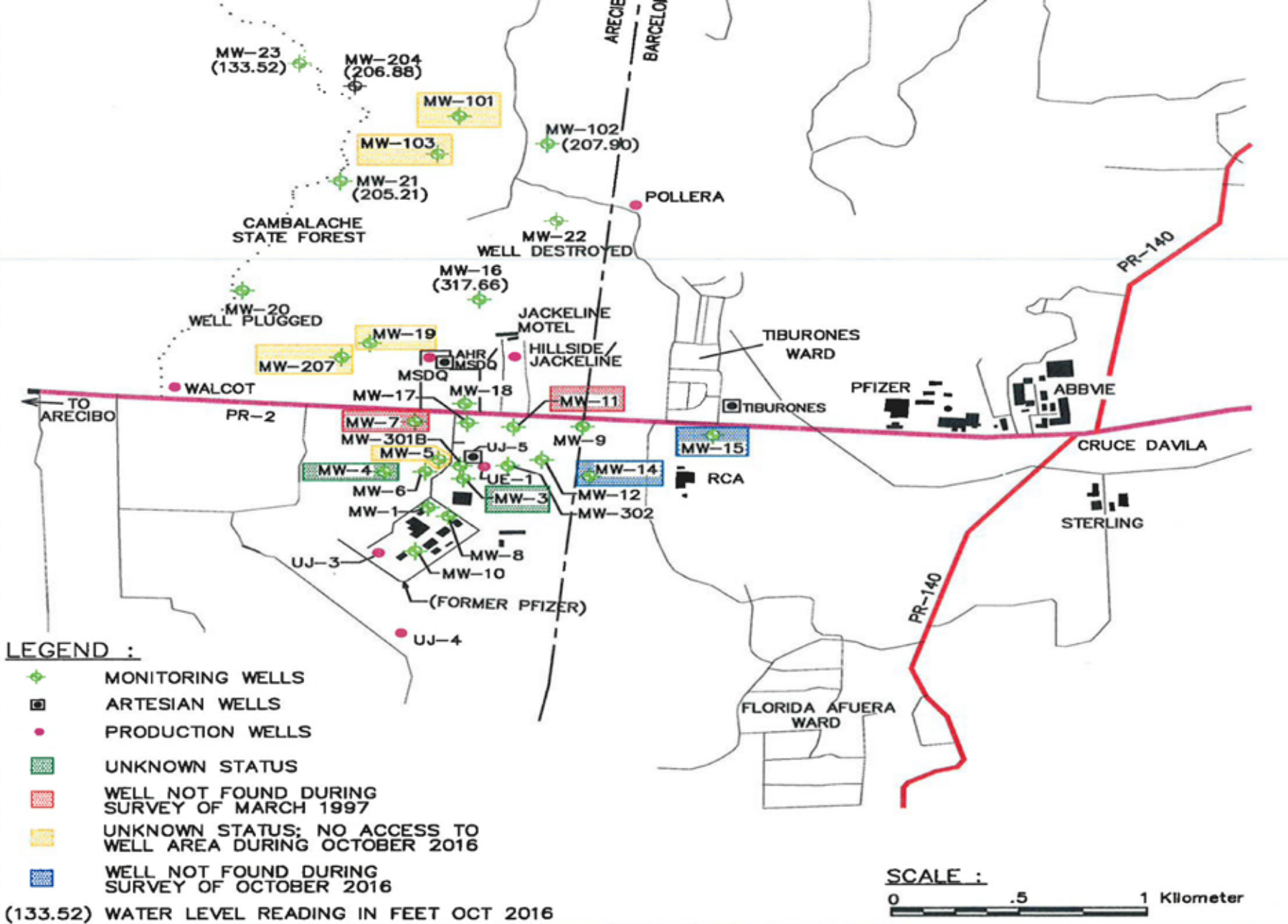


FIGURE 1 – LOCATION OF EXISTING MONITORING AND PRODUCTION WELLS
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